

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 03 MAY 2005

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Applicant's or agent's file reference BIE006260/DM/AZ	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/B 03/00235	International filing date (day/month/year) 15.01.2003	Priority date (day/month/year) 15.01.2003
International Patent Classification (IPC) or both national classification and IPC H04L25/02		
Applicant TELEFONAKTIEBOLAGET L M ERICSSON et al.		

- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 6 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of sheets.

- This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 28.07.2004	Date of completion of this report 02.05.2005
Name and mailing address of the International preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Orozco Roura, C Telephone No. +31 70 340-3890 

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International application No. **PCT/IB 03/00235**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-17 as originally filed

Claims, Numbers

1-16 as originally filed

Drawings, Sheets

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-16
	No: Claims	
Inventive step (IS)	Yes: Claims	3,9
	No: Claims	1,2,4-8,10-16
Industrial applicability (IA)	Yes: Claims	1-16
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Reference is made to the following documents:

- D1: MUNETA S ET AL: "A NEW FREQUENCY-DOMAIN LINK ADAPTATION SCHEME FOR BROADBAND OFDM SYSTEMS" VTC 1999-FALL. IEEE VTS 50TH. VEHICULAR TECHNOLOGY CONFERENCE. GATEWAY TO THE 21ST. CENTURY COMMUNICATIONS VILLAGE. AMSTERDAM, SEPT. 19 - 22, 1999, IEEE VEHICULAR TECHNOLOGY CONFERENCE, NEW YORK, USA, vol. 1 CONF. 50, September 1999 (1999-09), pages 253-257, XP000929050 ISBN: 0-7803-5436-2
- D2: NUNES M ET AL: "Effects of downlink intercell interference on MC-CDMA system performance" PERSONAL, INDOOR AND MOBILE RADIO COMMUNICATIONS, 1998. THE NINTH IEEE INTERNATIONAL SYMPOSIUM ON BOSTON, MA, USA 8-11 SEPT. 1998, NEW YORK, USA, vol. 3, 8 September 1998 (1998-09-08), pages 1050-1054, XP010314659 ISBN: 0-7803-4872-9
- D3: ONIZAWA T ET AL: "A SIMPLE ADAPTIVE CHANNEL ESTIMATION SCHEME FOR OFDM SYSTEMS" VTC 1999-FALL. IEEE VTS 50TH. VEHICULAR TECHNOLOGY CONFERENCE. GATEWAY TO THE 21ST. CENTURY COMMUNICATIONS VILLAGE. AMSTERDAM, SEPT. 19 - 22, 1999, IEEE VEHICULAR TECHNOLOGY CONFERENCE, NEW YORK, USA, vol. 1 CONF. 50, September 1999 (1999-09), pages 279-283, XP000929055 ISBN: 0-7803-5436-2
- V.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 does not involve an inventive step in the sense of Article 33(3) PCT.

The document D1, cited in the application, is regarded as being the closest prior art to the subject-matter of claim 1, and discloses (the references in parentheses applying to this document):

A method for estimating the time-dispersion (page 254, left-hand column, last paragraph, "delay spread") of a channel comprising D subchannels, wherein one computes from a received signal a set of estimated Channel Transfer Factors $H[v]$

(page 254, left-hand column, last paragraph, " c_n "), where v , $0 \leq v < D$, is the subchannel number, said method comprising a step of calculating, for a predetermined strictly positive integer d , a correlation factor C_d (page 254, left-hand column, last paragraph, " $f_{\text{delay_spread}}$ ") representing the correlations in amplitude (page 254, right-hand column, first paragraph, functions are calculated using the amplitude of c_n) between pairs $H[v]$ and $H[v+d]$ of said computed CTF estimates (" c_n " and " c_{n+1} ", i.e. $d=1$).

The subject-matter of claim 1 therefore differs from this known method in that both the phase and the amplitude are used to calculate the correlation factor.

The problem to be solved by the present invention may therefore be regarded as increasing the accuracy of the correlation calculation.

The solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons: document D2 teaches (see D2, page 1051, last paragraph) that "amplitudes and phases of adjacent subcarriers are correlated but become less so if the channel delay spread is large", i.e. the correlation of both amplitudes and phases of adjacent subcarriers is a measure of the time-dispersion. Using the teaching of D2, and faced with the problem to be solved, the skilled person would increase the accuracy of the correlation calculation by considering all the information available in the adjacent subcarriers, i.e. both the phase and the amplitude, thus arriving at the subject-matter of claim 1 without any inventive activity.

- V.2 The same reasoning applies, *mutatis mutandis*, to the subject-matter of the corresponding independent claims 6, 14 and 16 which therefore are also considered not inventive.
- V.3 Dependent claims 2, 4, 5, 7, 8, 10-13 and 15 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, see documents D1, D2 and D3 and the corresponding passages cited in the search report.
- V.4 The combination of the features of dependent claims 3 and 9 is neither known from,

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nor rendered obvious by, the available prior art, for the following reasons: None of the prior art documents discloses or hints at using the mean channel estimation signal-to-noise ratio when calculating the correlation factor C_d , in order to take into account the effect of noise in the calculation. The solution proposed in claims 3 and 9 of the present application is therefore new and inventive.